

Geologic Landscape and Coastal Assessments Subactivity

Subactivity	FY 2000 Estimate	Uncontrol. & Related Changes	Program Changes	FY 2001 Budget Request	Change from FY 2000
Earth Surface Dynamics	12,327	+745	+2,450	15,522	+3,195
National Cooperative Geologic Mapping	19,781	+457	⁽¹⁾ +7,500	27,738	+7,957
Coastal and Marine Geology	33,327	+602	0	33,929	+602
Total Requirements \$000	65,435	+1,804	+9,950	77,189	+11,754

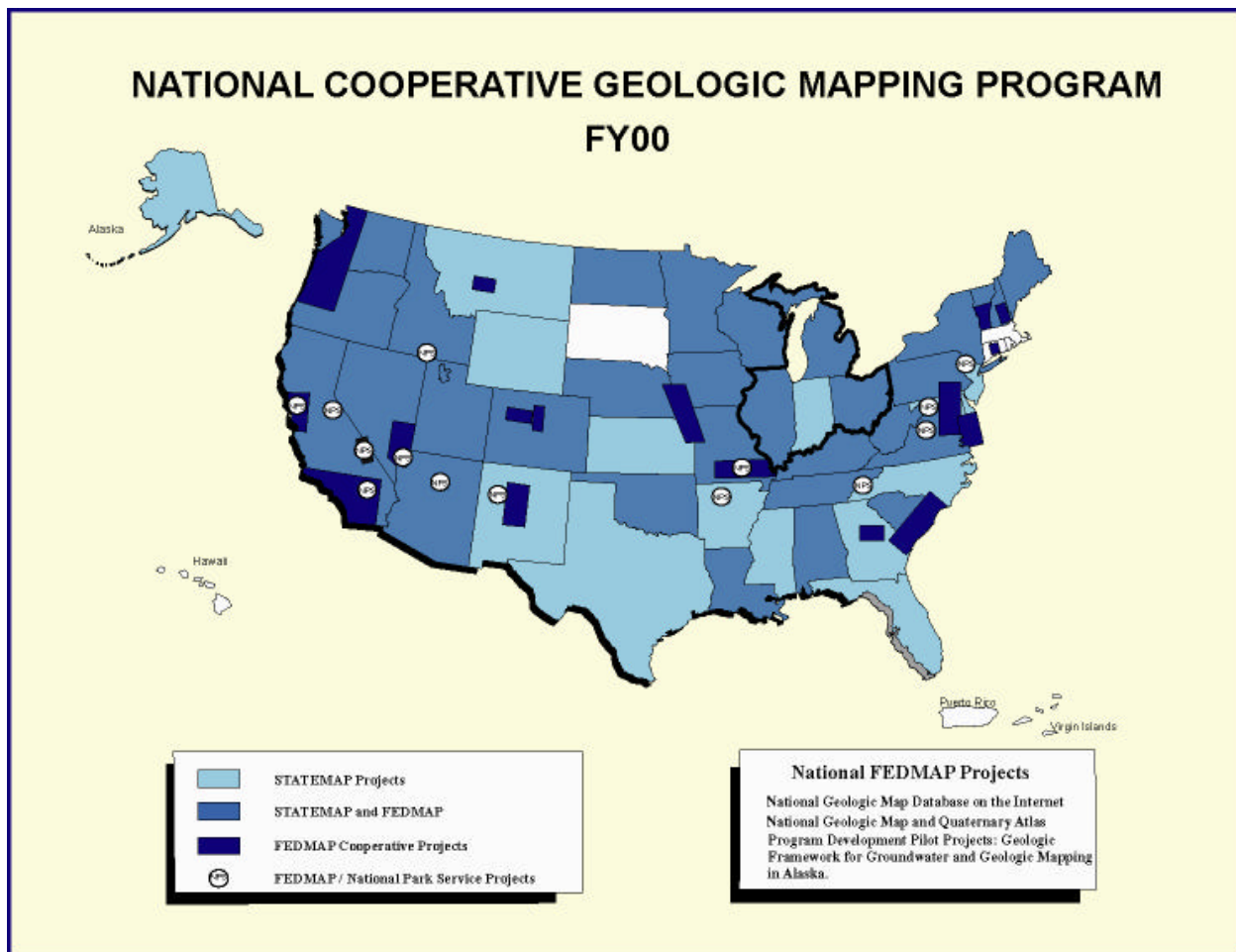
¹ See Program Change section for details on C/FIP (+\$7,500)

National Cooperative Geologic Mapping

Current Program Highlights

The National Cooperative Geologic Mapping Program (NCGMP) was created following the passage of the National Geologic Mapping Act of 1992, and reauthorized in 1997 and 1999 as Public Law 106-148. The Program is the primary source of multiple-purpose geologic maps that depict the distribution of the Nations' sediment and rocks and the resources they provide. Geologic maps are vital in the exploration and development of mineral, energy, and water resources, evaluating and planning for environmental protection, reducing losses from landslides and other ground failures, mitigating effects of coastal and stream erosion, siting of critical facilities, and planning for basic earth science research. The Program provides state-of-the-art digital geologic maps to the Nation in a cost-effective timely manner through cooperation among Federal, State, Academic, and private-sector earth-science organizations. Priorities and execution of the NCGMP are guided by a Federal Advisory Committee, which meets annually and consists of representatives from Federal and State governments, Academia, and from the private sector. Progress and status reports on the Program were prepared for the Secretary of the Department of the Interior and for the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

The NCGMP supports the Mapping Act through three main program components FEDMAP, STATEMAP, and EDMAP. FEDMAP, the Federal component consists of regional geologic mapping and synthesis projects. Government and private-sector clients and cooperators are not only users of program products, but also are involved in program planning. STATEMAP supports geologic mapping studies by state geological surveys through a competitive grant program that matches every federal dollar with a state dollar. Mapping priorities are determined with the help of State Mapping Advisory Committees in each state that include representatives from all levels of government, the private sector, academia, and industry. In 1999, 45 states received funds to accomplish more than 150 geologic mapping projects across the Nation. EDMAP supports the training of a new generation of geologic mappers in universities and colleges across the Nation through a competitive grant program that matches every federal dollar with a dollar from academic institutions. Both graduate and undergraduate students are encouraged to coordinate their mapping closely with our partners in the state geological surveys and scientists from the USGS. In 1999, 60 students from 41 universities in 29 states were funded to carry out well-mentored geologic mapping projects.



Recent Accomplishments

National Mapping Efforts

The National Geologic Map Database is mandated by the National Geologic Mapping Act, as a national archive of spatial geologic, geophysical, geochemical, geochronologic, and paleontologic information. The project is designed to build the database as a distributed system with a primary entry point on the World Wide Web for search and retrieval of information. The database consists of metadata for all published paper geoscience maps and book publications that contain maps; metadata for published digital map data; coherent nationwide geologic map coverage at intermediate and small scales; a distributed data management system for access to digital data held by a wide variety of data producers nationwide; a Web-based mechanism for searching and retrieving information from the database; and instructional and general-interest material detailing uses of geologic information and the value to society. Currently, the Database contains 95% of all USGS geologic map publications and 6% of State Geological Survey geologic map publications. A Digital Mapping Techniques workshops was held in Madison, Wisconsin, in cooperation with the American Association of State Geologists and the Geological Survey of Canada to help move the state surveys and the USGS toward development of more cost-effective, flexible, and useful systems for digital mapping and GIS analysis.

The Science in the Parks initiative is an ongoing priority of the Department of Interior aimed towards maintaining and protecting our National Parks. Recent rockfalls in Yosemite and Grand Canyon National Parks remind us of the growing need for geologic information to guide land management decisions, provide a safe environment for visitors, and enhance the interpretation of National Park lands. The NCGMP is the principal USGS partner involved with coordinating and prioritizing geologic studies in cooperation with the National Parks Service. The projects provide geologic maps and unbiased science on issues that range from geologic controls on water quality in the Ozarks and Buffalo River National Scenic Waterways to habitat preservation in Death Valley. Scientific information is provided in digital and standard formats that contribute to land-use management, educational outreach, inventories, and monitoring of natural resources to meet national and regional earth science needs.

The Quaternary Atlas of the eastern two thirds of the United States at 1:2.5 million scale has been completed as a product for the USGS National Atlas. The map is the premier product from more than twenty-years of collaboration between State and Canadian Provincial geological surveys, universities, the Geological Survey of Canada, and the U.S. Geological Survey. The Quaternary Period includes the time of all activities of man. The rocks, deposits, and materials depicted on the map include the soils and surface mantle of the earth, in which man's activities are concentrated. The map units are distinguished in part on the basis of physical, chemical, sedimentologic, and engineering properties. The map provides a national-scale database for all concerned with shallow groundwater aquifers, sand and gravel construction materials, soil and groundwater contamination and pollution, and toxic and other shallow waste disposal.

Regional Mapping Efforts

The Las Vegas Urban Corridor Project completed 1:100,000 scale geologic mapping of the Las Vegas and Lake Mead 1-degree quadrangles. The map areas include most of the city and suburbs of Las Vegas, Nevada as well as Lake Mead National Recreation Area. Mapping has identified the distribution of permeable strata and fracture zones (which are the pathways for water resources and pollution plumes) and delineated expansive soils, potential flood-hazard areas, subsidence due to ground-water withdrawal, landslides, and seismic faults and will contribute to planning and zoning efforts by local and state officials. Additionally, the maps aid local water districts in locating ground-water resources and areas for artificial ground-water recharge.

The San Francisco Bay Mapping Project is constructing digital databases of surficial and bedrock geology for ten San Francisco Bay area counties. The Regional Geologic Data Library will provide customers with on-line access to topical and geographically indexed data. Additionally, a variety of research efforts are continuing to understand and help characterize the hazard potential in the Bay region, in particular hazards associated with different types of landslides and earthquake hazards associated with strike-slip faults. Detailed, large-scale mapping in regions of fault segmentation will help in understanding the where, when and how great earthquakes are initiated.

The Appalachian Regional Geology Hydrology project completed geologic mapping of six quadrangles covering the Washington-Baltimore urban area. Collectively, these geologic maps provide a framework for environmental assessments, urban planning, and future resource and hazard investigations in an area of the Chesapeake Bay watershed that has sustained 3 centuries of urban development. The area was chosen based on input from a public forum and considered several factors, including societal relevance, customer needs, interagency

agreements and partnerships, available staff, and contribution to USGS initiatives. The forum was a significant step in ongoing efforts to promote communication between users and providers of geologic map information and to encourage user input and partnerships in the design of geologic mapping activities and products.

The central Death Valley region of California and Nevada is the area of principal discharge for regional groundwater flow from an extensive system encompassing 15,000 square miles of southern and central Nevada. A new FEDMAP project will provide the three-dimensional structural and stratigraphic framework for the area to support regional groundwater flow-model studies. The project coordinates with Department of Energy efforts to develop integrated steady state and transient flow models for the nearby Nevada Test Site and Yucca Mountain nuclear repository. Products will include digital geologic maps and GIS databases at 1:24,000 and 1:100,000 scales. Additionally, the project will assist the National Park Service in assessing environmental issues related to geology, geologic hazards and groundwater discharge in Death Valley National Park. The Park Service has significant concerns related to impacts of earthquake and mass wasting hazards on current and future Park development that lie astride the active Death Valley-Furnace Creek fault systems. Potentially large-scale offsets on the fault system is only rivaled by the San Andreas Fault.

Urban Mapping Efforts

Growing urban areas around Seattle and other lowland Washington cities are prone to seismic shaking, ground failure, and damage from earthquakes. In an effort to understand the earthquake hazard posed by the Seattle fault, the USGS has undertaken detailed geologic mapping and high-resolution geophysical surveys of the fault zone in the central Puget Lowland. The geologic mapping is a cooperative effort between the USGS, the University of Washington, and the City of Seattle. Field investigations guided by airborne laser terrain mapping (ALTM) have revealed that previously unknown active surface ruptures have occurred along a strand of the Seattle fault. The combination of geologic field mapping and ALTM mapping shows great promise for accurately mapping active fault structures, landslides, surficial deposits, and watercourses throughout the Puget Lowland. At the Seattle Urban Geologic Hazards Workshop held in February 1999 - sponsored by the USGS, University of Washington and FEMA's Project Impact - local cooperators noted that in addition to improving hazard assessments, integrated ALTM/geologic mapping also provides important information for surface-groundwater interactions and assessment of salmon habitat.

Geologic and hydrologic framework studies along the southeastern coastal plain of the United States produced maps defining the three-dimensional structure and continuity of aquifers that supply drinking water in the area. These FEDMAP maps will also help to resolve multi-state issues of ground-water quality and salt-water contamination issues. Partners include the USGS South Carolina Water District office, the Department of Energy, and the South Carolina Department of Natural Resources. Geologic mapping, supported by STATEMAP funds and the South Carolina Geological Survey, is concentrated in the fastest growing recreational and retirement area of the state along the coast. As man's activities come in contact with the fragile estuary ecosystem, the need for geologic mapping increases.

Geologic mapping in southern California is defining the structure and history of the San Andreas Fault system and its relation to earthquake hazards. This is a cooperative FEDMAP project with the California Division of Mines and Geology (CDMG), the USGS Water Resources District Office, the Mojave Water Agency, the USGS Earthquakes and Landslides programs, and a long list of additional cooperators. The project also maps ground-water basins in three-

dimensions to support the water resource needs of the populous desert region from the Mexico border through the Los Angeles basin, and eastward into the Mojave Desert. Closely coordinated geologic mapping supported by STATEMAP funds and CDMG is producing detailed maps in Orange and San Diego Counties for the Seismic Hazards Zoning Program. These maps are required by state law to be used for planning and development purposes at the county and municipal level. University students supported by EDMAP have been involved in both the FEDMAP and STATEMAP geologic mapping efforts underway in California.

Recent geophysical surveys and geologic mapping provides important information about detailed patterns of buried faults that offset the Santa Fe Group aquifers in the Middle Rio Grande Basin. The organization of this effort dovetails geologic mapping supported by all three components of the program, FEDMAP, STATEMAP, and EDMAP. Students supported under EDMAP work closely with geologists from both the USGS and the New Mexico Bureau of Mines and Mineral Resources. The new surface and subsurface data contributes to a three-dimensional model of the basin structure. The model will allow water allocation policies to be formulated on a more factual and technically rigorous basis and will facilitate more credible forecasts of the possible impacts of various water-use projections for the City of Albuquerque.